WHAT IS CLAIMED IS:

1. An electrically driven aircraft cabin and ventilation and environmental control system which comprises means for capturing ram air, electrically driven means for pressurizing said ram air, and means for thermally conditioning said pressurized ram air.

2. A system according to claim 1, wherein said electrically driven means for pressurizing said ram air comprises a ventilation compressor driven by an electric motor mounted on a shaft.

3. A system according to claim 2, wherein said thermal conditioning means comprises heat exchanger means for removing heat from a flow of compressed air exiting said ventilation compressor.

4. A system according to claim 3, wherein said heat exchanger removing means comprises a secondary heat exchanger which utilizes a portion of said ram air as a heat sink.

5. A system according to claim 4, further comprising means for precooling said portion of said ram air utilized as said heat sink.

6. A system according to claim 3, wherein said thermal conditioning means further comprises means for further cooling said flow of compressed air exiting said heat exchanger means.

7. A system according to claim 6, wherein said further cooling means comprises a reheater heat exchanger for cooling said flow

of compressed air exiting said heat exchanger means and a condenser heat exchanger for condensing water vapor in said air exiting said reheater heat exchanger.

8. A system according to claim 7, wherein said thermal conditioning means further comprises means for heating said air exiting said condenser heat exchanger.

9. A system according to claim 8, wherein said heating means comprises said reheater heat exchanger.

10. A system according to claim 8, wherein said thermal conditioning means further comprises a cooling turbine to reduce the pressure and temperature of the warmed air exiting said reheater heat exchanger.

11. A system according to claim 10, further comprising means for mixing engine bypass air with air exiting said cooling turbine.

12. A system according to claim 10, wherein said cooling turbine is mounted to said shaft.

13. A system according to claim 10, wherein said cooling turbine is mounted to a second shaft.

14. A system according to claim 13, further comprising an electrical generator mounted to said second shaft and a power conversion unit connecting said electrical generator and said electric motor.

15. A system according to claim 10, wherein said thermal

conditioning means further comprises a mix manifold for receiving an exit air stream from said cooling turbine and for delivering air to a cabin.

16. A system according to claim 15, wherein said mix manifold receives at least one of recirculated air from said cabin, a portion of said compressed air prior to said compressed air entering said heat exchanger means, and hot gas bypass air from an engine.

17. A system according to claim 16, further comprising means for exhausting a portion of cabin exhaust air to ambient.

18. A system according to claim 16, further comprising a recovery heat exchanger for receiving said air exiting said compressor and means for delivering cabin exhaust air to said said recovery heat exchanger to act as a heat sink.

19. A system according to claim 18, further comprising a power turbine mounted to said shaft and said cabin exhaust air delivered to said recovery heat exchanger further being used to drive said power turbine.

20. A system according to claim 18, further comprising a condensing turbine mounted to said shaft and said condensing turbine receiving cool dehumidified air exiting said condenser heat exchanger and further expanding the air so that said air exits said condensing turbine close to a desired cabin pressure level.

21. A method for delivering conditioned air to an aircraft cabin comprising the steps of:

capturing ram air;

pressurizing said ram air;

thermally conditioning said pressurized ram air; and

delivering said thermally conditioned air to said aircraft cabin.

22. A method according to claim 21, wherein said pressurizing step comprising providing an electrically driven compressor and introducing at least a first portion of said captured ram air into an inlet of said compressor.

23. A method according to claim 22, wherein said step of thermally conditioning said pressurized ram air comprises providing a secondary heat exchanger and introducing an outlet stream of air from said compressor into said secondary heat exchanger.

24. A method according to claim 23, further comprising cooling a second portion of said captured ram air and introducing said cooled second ram air portion into said secondary heat exchanger as a heat sink.

25. A method according to claim 23, providing a reheater heat exchanger and a condenser and further cooling said pressurized ram air by passing an exit stream of air from said secondary heat exchanger through said reheater heat exchanger and said condenser.

26. A method according to claim 25, further comprising warming said air exiting said condenser by passing said air through said reheater heat exchanger.

27. A method according to claim 26, further comprising providing a cooling turbine, introducing said warmed air exiting said reheater heat exchanger into an inlet of said cooling turbine, and expanding said air introduced into said cooling turbine inlet.

28. A method according to claim 27, further comprising introducing said expanded air exiting said cooling turbine into said condenser and delivering said expanded air in a cooled condition to a cabin air distribution system mix manifold.

29. A method according to claim 28, further comprising mixing hot gas bypass air from an engine with said expanded air prior to introducing said expanded air into said condenser.

30. A method according to claim 28, further comprising introducing at least one of recirculated cabin air, hot gas bypass air and a portion of said air exiting said secondary heat exchanger into said mixing manifold.

31. A method according to claim 30, further comprising exhausting cabin air overboard the aircraft.

32. A method according to claim 30, further comprising providing a recovery heat exchanger, introducing compressed air exiting said compressor into said recovery heat exchanger, and providing a cabin air portion as to said recovery heat exchanger for use as a heat sink.

33. A method according to claim 32, further comprising exhausting said cabin air portion to the ambient after its use as a heat sink.

34. A method according to claim 32, providing a power turbine to drive said compressor, introducing said cabin air portion in a heated condition into an inlet of said power turbine to drive a shaft on which said power turbine and said compressor are located, and exhausting an exit stream from said power turbine to the ambient atmosphere.

35. A method according to claim 28, further comprising providing a condenser turbine and passing said air stream exiting said condenser through said condenser turbine prior to said delivering step.

36. A method according to claim 27, further comprising mounting said compressor and an electric motor for driving said compressor on a first shaft, mounting said cooling turbine and an electric generator on a second shaft, and transmitting energy flow by providing an electric link between said electric motor and said electric generator.